

LOWERING THE SNR WALL USING ADAPTIVE TECHNIQUES

A Thesis submitted towards the partial fulfillment of the requirement for the
award of the degree of

Master of Technology

in

Microwave and Optical Communication

Submitted by

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2K13/MOC/11

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(FORMERLY DELHI COLLEGE OF ENGINEERING)**

DELHI-110042

JULY 2015



DELHI TECHNOLOGICAL UNIVERSITY

Established by Govt. Of Delhi vide Act 6 of 2009

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CERTIFICATE

This is to certify that the thesis report entitled, "*Lowering the SNR wall using adaptive techniques*" being submitted by **Sakshi** to the *Department of Electronics and Communication Engineering and Applied Physics, Delhi Technological University, Delhi* in partial fulfillment of the requirement for award of Master of Technology degree in *Microwave and Optical Communication* is a record of bona fide work carried out by him under the supervision and guidance of **Prof. Rajiv Kapoor**. The matter embodied in this report has not been submitted for the award of any other degree.

Prof. Rajiv Kapoor

Supervisor

DECLARATION

I hereby declare that all the information in this document has been obtained and presented in accordance with academic rules and ethical conduct. This report is my own, unaided work. I have fully cited and referenced all material and results that are not original to this work. It is being submitted for the degree of Master of Technology in Engineering at the Delhi Technological University. It has not been submitted before for any degree or examination in any other university.

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ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my project supervisor, **Prof. Rajiv Kapoor** (Department of Electronics and Communication Engineering) Delhi Technological University, for his supervision, invaluable guidance, motivation and support throughout the extent of the project. I have benefitted immensely from his wealth of knowledge.

I am indebted to **Prof. Prem R Chadha**, Head of Department of Electronics and Communication Engineering, Delhi Technological University for his support and encouragement in carrying out this project.

I wish to express my heart full thanks to **Prof. S.C. Sharma**, Head of Department of Applied for his support that helped me a lot in successful Physics, Delhi Technological University completion of this project.

I am also grateful to **Prof. Pradeep Kumar**, Vice-Chancellor, Delhi Technological University for providing the research environment in the institute.

My gratitude is extended to my colleagues and friends who have not been mentioned here personally in making this project a success.

Last but not least, I take this opportunity to express my deepest thanks to my parents, my brother and my family. Without their support, love and encouragement, it would not have been possible to pursue M.Tech. Degree studies. I sincerely thank them.

Sakshi

ABSTRACT

As wireless applications having growth rapidly in its services it becomes essential to deal with spectrum shortage problem. If we take a small part of radio spectrum and scan that portion including revenue rich urban areas, we will find that for some band of frequencies spectrum is overloaded on the same time other frequencies band are some frequency bands in the spectrum are vacant, there will also some range of frequencies available which are moderately occupied. This leads to generate a concept of underutilization of radio spectrum; Cognitive radio (CR) technology takes part in to improve this problem through improved utilization of radio spectrum.

Cognitive radio is called secondary users in the wireless communication in which a transceiver can smartly sense in which RF channels primary users (licensee users) are present or absent, and it has capability to move into vacant channels or out of the channel without disturbing the occupied ones. Spectrum sensing plays an important role in cognitive radio concept. Various spectrum sensing techniques have been already discussed in past research work in wireless communication field. The main role of spectrum sensing is to detect the unused spectrum called white hole.

In this thesis we analyze the performance of energy based detection spectrum sensing scheme in cognitive radio. By considering the uncertainty presence in wireless channel, degrade performance of energy detector is showed called “SNR wall”. This limitation can be improved by adopting a new adaptive technique to reduce SNR wall as shown in the simulation results. Computer simulation showed that detection performance for schemes are sensitive in lower signal-to-noise under noise uncertainty environment. Improved results obtained from new technique are shown in simulation.

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